

IN THE CLAIMS

Claims 1-16, 25-36, 38-39, and 45 have previously been canceled without prejudice.

Please cancel claims 44 and 46-51 without prejudice as being drawn to a non-elected invention.

Please enter the pending claims as follows:

1.-16. (Canceled)

17. (Previously Presented) A method of forming a capacitor, comprising:

- forming an in-laid conductor structure on a substrate, the in-laid conductor structure formed in an intra-layer dielectric;

- forming an electrode layer directly on the conductor structure, wherein forming the electrode layer comprises forming columnar grains of an electrode layer material to be in direct contact with the conductor structure and selectively etching boundaries of the columnar grains;

- forming a first layer over the electrode layer;

- forming a second layer over the first layer;

- forming a patterned masking layer over the second layer such that a portion of the second layer is exposed, and patterning the second, first, and electrode layers in alignment with the masking layer, so as to form a vertical stack superjacent the conductor structure; and

- forming a second conductor over the vertical stack.

18. (Previously Presented) The method of claim 17, wherein the electrode layer comprises tantalum, the first layer comprises tantalum pentoxide, and the second layer comprises tantalum.

19. (Original) The method of claim 18, wherein the in-laid conductor and the second conductor comprise copper.

20. (Previously Presented) The method of claim 17, wherein the columnar grains include tantalum.

21. (Previously Presented) The method of claim 17, wherein forming the first layer comprises depositing tantalum pentoxide.

22. (Previously Presented) The method of claim 21, wherein forming the second layer comprises depositing tantalum.

23. (Previously Presented) The method of claim 17, further comprising forming an electrically insulating layer over the second layer and patterning the insulating layer so as to expose portions of the second layer prior to forming the second conductor.

24. (Previously presented) The method of claim 23, wherein forming a second conductor over the vertical stack includes making electrical contact between the second conductor and the second layer.

25.-36. (Canceled)

37. (Previously Presented) A method comprising:

forming a first conductor structure in an inter-layer dielectric (ILD);

forming a bottom electrode layer directly on the first conductor structure, the bottom electrode layer consisting essentially of a material selected from the group consisting of tantalum nitride (TaN), titanium nitride (TiN), tungsten nitride (WN), platinum (Pt), iridium (Ir), and ruthenium (Ru), wherein forming the bottom electrode layer comprises depositing a polycrystalline film of the material and selectively etching grain boundaries of the film with a wet chemical etch;

forming a dielectric layer directly on the bottom electrode layer;

forming a top electrode layer directly on the dielectric layer; and

forming a second conductor structure over the top electrode layer.

38.-39. (Canceled)

40. (Previously Presented) The method of claim 37, wherein the dielectric layer is barium strontium titanate (BST) or tantalum pentoxide (Ta₂O₅).

41. (Previously Presented) The method of claim 37, wherein the top electrode layer consists essentially of a material selected from the group consisting of Ru, TaN, TiN, WN, platinum (Pt), and iridium (Ir).

42. (Previously Presented) The method of claim 37, further comprising:
forming a hardmask layer over the top electrode layer;
forming a photoresist layer over the hardmask layer;
patterning the photoresist layer to expose a portion of the hardmask layer;
etching the exposed portion of the hardmask layer using a fluorine based etchant to expose a portion of the top electrode layer;
removing the photoresist layer by ashing; and
etching the exposed portion of the top electrode layer and the dielectric and bottom electrode layer directly under the exposed portion of the top electrode layer to form a capacitor stack, wherein the second conductor structure is formed over the top electrode layer of the capacitor stack.

43. (Previously Presented) The method of claim 37, further comprising:
forming a nitride layer over the top electrode layer;
forming a second ILD over the nitride layer;
forming a via in the second ILD to expose a portion of the nitride layer;
etching the exposed portion of the nitride layer to expose a portion of the top electrode layer;
forming a conductive barrier layer over exposed surfaces of the via; and
filling the via with a conductive material to form the second conductor structure.

44. – 51. (Canceled)